DEFCON 20
SAFES AND CONTAINERS – INSECURITY DESIGN EXCELLANCE







DESIGN DEFECTS IN SECURITY PRODUCTS THAT HAVE REAL CONSEQUENCES IN PROTECTING LIVES AND PROPERTY



GUN SAFES: A CASE STUDY

- GUN SAFES AND PROPERTY SAFES ARE SOLD TO STORE WEAPONS
- MANY ARE NOT SECURE
- ANALYSIS OF INSECURITY
  - Boltworks and mechanism
  - Biometrics
  - Key Locks



SECURITY REPRESENTATIONS

- ♦ SECURE FOR STORING WEAPONS
- ♦ CERTIFIED BY CALIFORNIA DOJ
- ♦ PROTECT KIDS FROM GUNS





MANUFACTURERS, SECURITY, and ENGINEERING

- Many manufacturers do not understand bypass techniques
- Many imports, no security, just price
- Large reputable companies sell junk
- Representations that are not true by:
  - Manufacturers
  - Dealers
  - Retail



"INSECURITY ENGINEERING": A DEFINITION

- Intersection of mechanical and security engineering
- Must have both mechanics and security
- Must understand bypass techniques and design against at all stages in process
- Develop a new way of thinking by Manufacturers
- **Problem: Engineers know how to make things work but not how to break them**

MYTHS ABOUT SECURITY AND PRODUCT DESIGN



- It is patented
- Engineers think the product is secure
- Product has been sold for many years
- No known bypass tools or techniques
- Product meets or exceeds standards
- Testing labs have certified the product
- Government labs say its secure
- No consumer complaints



STANDARDS: THE PROBLEM

- MEET ALL STANDARDS BUT THE LOCK OR SAFE CAN BE EASILY OPENED
  - Standards are not up-to-date
  - Not test for many methods of attack
  - Consumer relies on standards for security
  - Just because you meet standards does not mean the lock or safe is secure
- STANDARDS CAN MISLEAD THE PUBLIC
- GUN LOCK AND SAFE STANDARDS ARE INADEQUATE AND DO NOT PROTECT

CALIFORNIA DOJ STANDARDS
ESSENTIALLY WORTHLESS







REGULATORY GUN SAFE STANDARDS - CAL DOJ

Section 977.50 of the CA Code of Regulations

- Shall be able to fully contain firearms and provide for their secure storage;
- Shall have a locking system consisting of at minimum a mechanical or electronic combination lock. The mechanical or electronic combination lock utilized by the safe shall have at least 10,000 possible combinations consisting of a minimum three numbers, letters, or symbols. The lock shall be protected by a case-hardened (Rc 60+) drill-resistant steel plate, or drill-resistant material of equivalent strength;



CAL DOJ STANDARDS: BOLTWORK

- Boltwork shall consist of a minimum of three steel locking bolts of at least ½ inch thickness that intrude from the door of the safe into the body of the safe or from the body of the safe into the door of the safe, which are operated by a separate handle and secured by the lock;



CAL DOJ STANDARDS: CONSTRUCTION

- Shall be capable of repeated use. The exterior walls shall be constructed of a minimum 12-gauge thick steel for a single-walled safe, or the sum of the steel walls shall add up to at least .100 inches for safes with two walls. Doors shall be constructed of a minimum of two layers of 12-gauge steel, or one layer of 7-gauge steel compound construction;



CAL DOJ STANDARDS: DOOR HINGES

- Door hinges shall be protected to prevent the removal of the door. Protective features include, but are not limited to: hinges not exposed to the outside, interlocking door designs, dead bars, jeweler's lugs and active or inactive locking bolts.



STANDARDS: NOT REAL-WORLD TESTS

- Standards do not protect consumers
- No testing of covert entry and mechanical bypass techniques
- Not real-world testing, aka "kids"
- Lowest common denominator for testing criteria was adopted for standards
- Allows certification of gun safes that can be opened in seconds by kids
- Most states rely on California as Model



SMALL GUN SAFES: MAJOR RETAILERS

amazon.com

Cabela's
World's Foremost Outfitter

Every Season Starts at
DICK'S
Sporting Goods

Walmart
Save money. Live better.



RETAILERS DON'T KNOW AND DON'T CARE: IT'S ALL ABOUT MONEY

- Contacted four major retailers to warn
- Only one was even concerned
- No action taken by any of them
- Stack-On: Absolutely no interest





MISREPRESENTATIONS ABOUT SECURITY

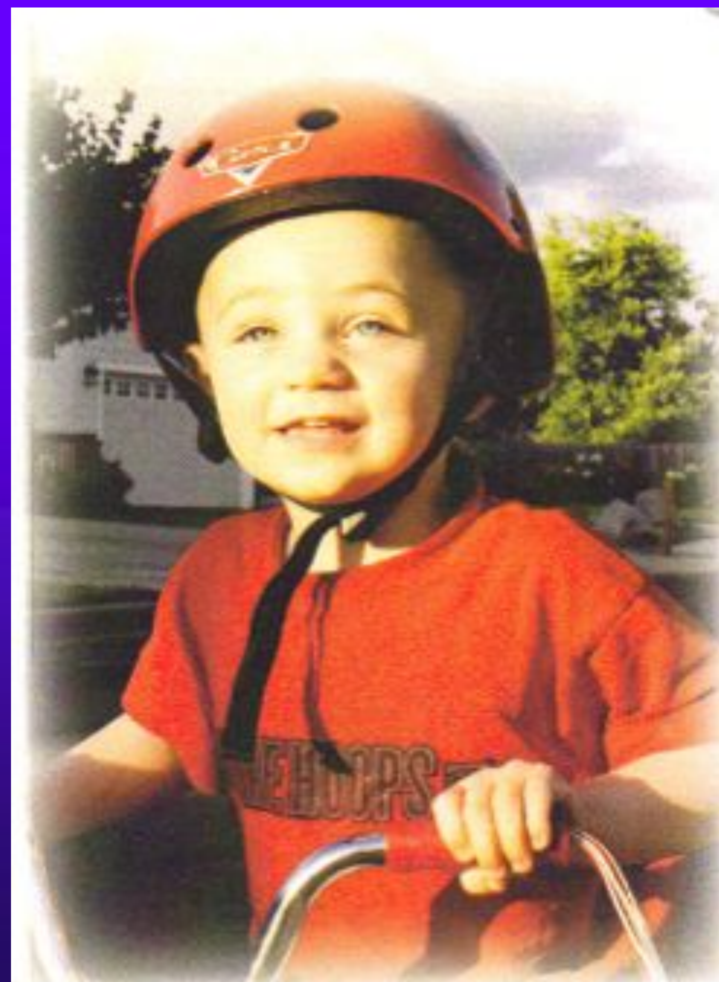
- California DOJ Certified
- Can be relied upon as secure
- Are safe to secure guns
- Cannot be opened by kids
- Only way to open: breaking
- Can be relied upon by consumer
- TSA Approved



DEALERS MISLEAD THE PUBLIC ABOUT SECURITY

[redacted]

EDDIE RYAN OWENS
11/27/06 - 09/15/2010





DETECTIVE OWENS CASE: Clark County Sheriffs Office

- 2003, Deputy’s son shot 10-year old sister with service weapon
- Sheriffs office mandated all personnel use gun safes at home and office
- Purchased for $36 each from Stack-On; several hundred units. State purchased thousands of them
- Mandated use for weapons at home and office and storage of evidence



STACK-ON SAFE FOR SHERIFFS DEPARTMENT

- UC Agent Eddie Owens had weapon in mandated safe in bedroom closet
- September 15, 2010, safe is accessed by child
- Three-year-old Eddie Ryan is shot and dies
- Investigation clears father
- Father is fired 14 months later for speaking up about defective safes
- Other deputies complain as well



CRIMINAL INVESTIGATION

- NO DNA TESTS
- NO GSR TESTS ON VICTIM OR SISTER
- NO FORENSIC ANALYSIS OF SAFE
- NO EXPERTISE BY LOCAL LAB
- NO UNDERSTANDING OF HOW THE SAFE WAS OPENED
- DON'T KNOW WHO FIRED THE WEAPON, ALTHOUGH 11-YEAR OLD SISTER CONFESSED



SECURITY LABS INVOLVEMENT FORENSIC INVESTIGATION

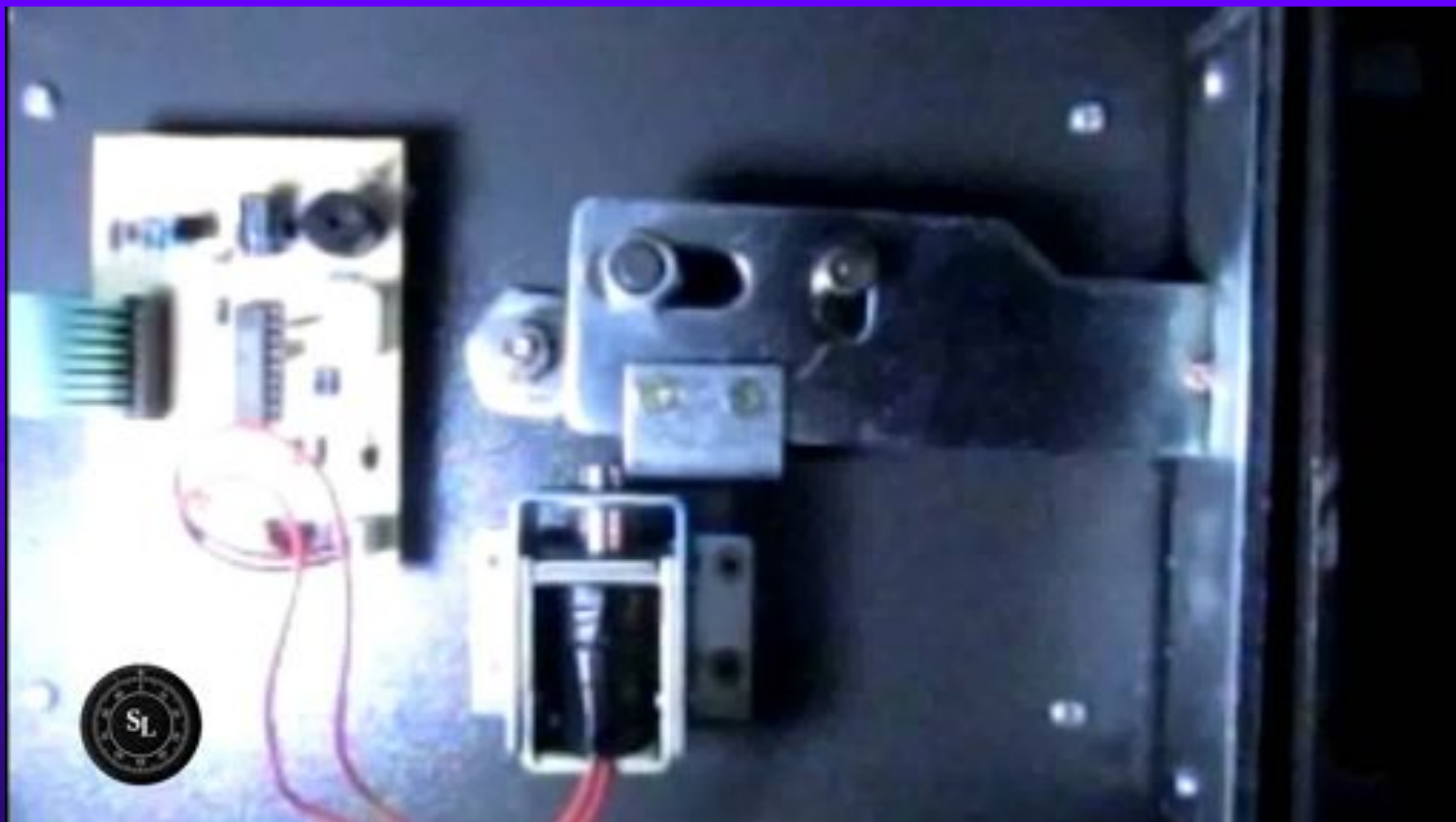
- Examined two safes from same batch;
- Analyzed bolt mechanism, solenoid;
- High speed video from inside of safe to document the problem;
- Analyzed similar safe from AMSEC, GUNVAULT, and BULLDOG;
- Contacted STACK-ON
- Expanded inquiry to all STACK-ON models



STACK-ON SAFE: FROM SAME BATCH



INTERNAL MECHANISM: THE DEFECTIVE DESIGN





HOW A THREE YEAR OLD CAN OPEN A SAFE





AMSEC DIGITAL:
SAME DEFECTIVE DESIGN





OUR INVESTIGATION

- FOUR MANUFACTURERS: AMSEC, STACK-ON, GUNVAULT, BULLDOG



ANALYZED 10 SAFES: All Defective Security Designs

- SECURITY DESIGNS
  - **Push-Button keypad lock**
  - **Fingerprint swipe reader biometric**
  - **Fingerprint image reader biometric**
  - **Multi-Button combination**
  - **Key bypass: wafer or tubular lock**
- ALL COULD BE BYPASSED EASILY
- NO SPECIAL TOOLS OR EXPERTISE



BYPASS TECHNIQUES

- **COVERT ENTRY METHODS: NONE COVERED BY DOJ STANDARDS**
- Shims
- Straws from McDonalds
- Screwdrivers
- Pieces of brass from Ace Hardware
- Paperclips
- Fingers

STACK-ON PC 650



STACK-ON PC 650: METHODS OF ATTACK





REMOVE RUBBER COVER



ACTIVATE LATCH







EASY LATCH ACCESS



BYPASS PROGRAM BUTTON





RE-PROGRAM THE CODE



SHIM THE WAFER LOCK





STACK-ON PDS 500 SAFE



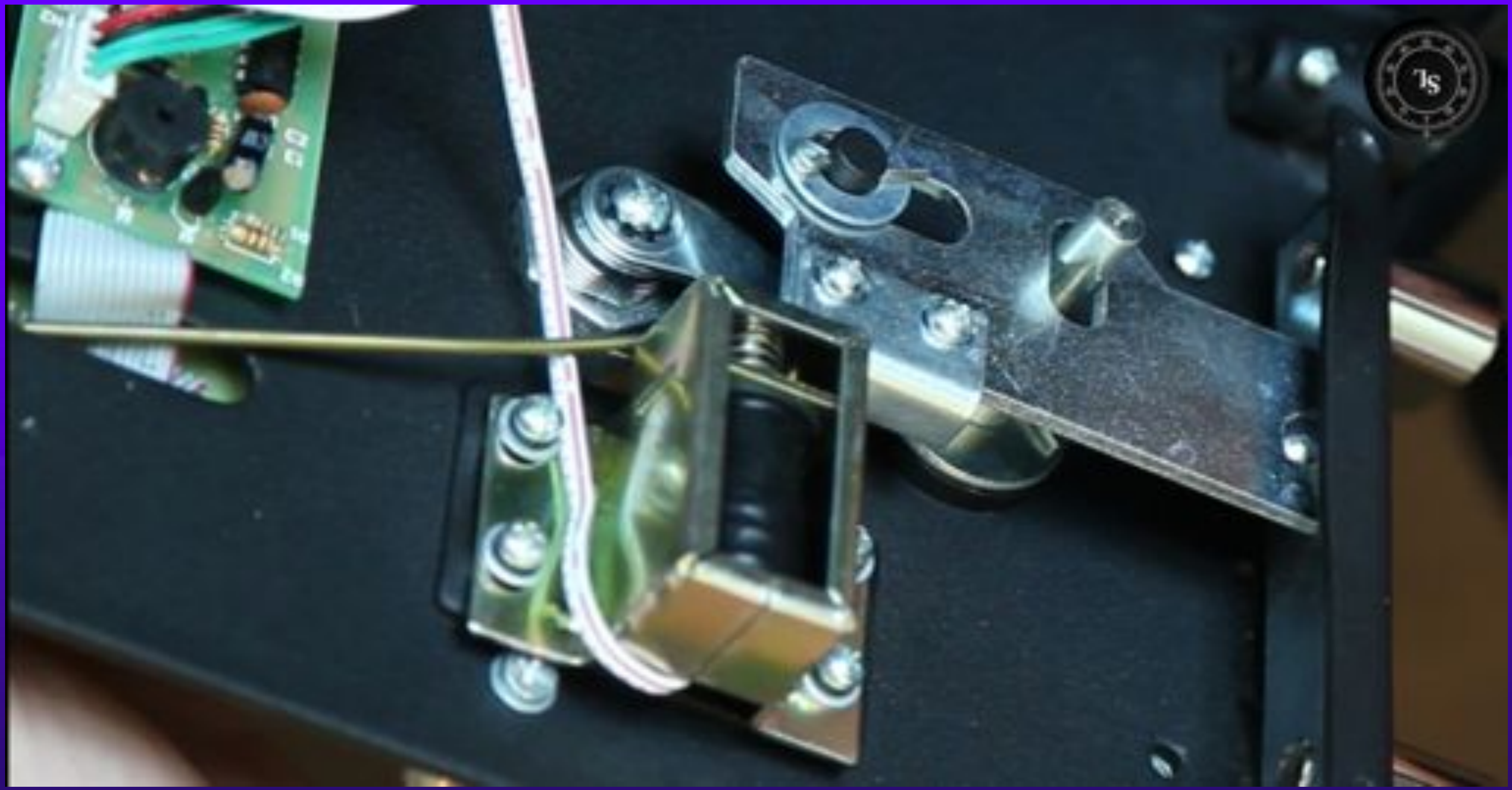
MAKE A HOLE AND MANIPULATE MECHANISM





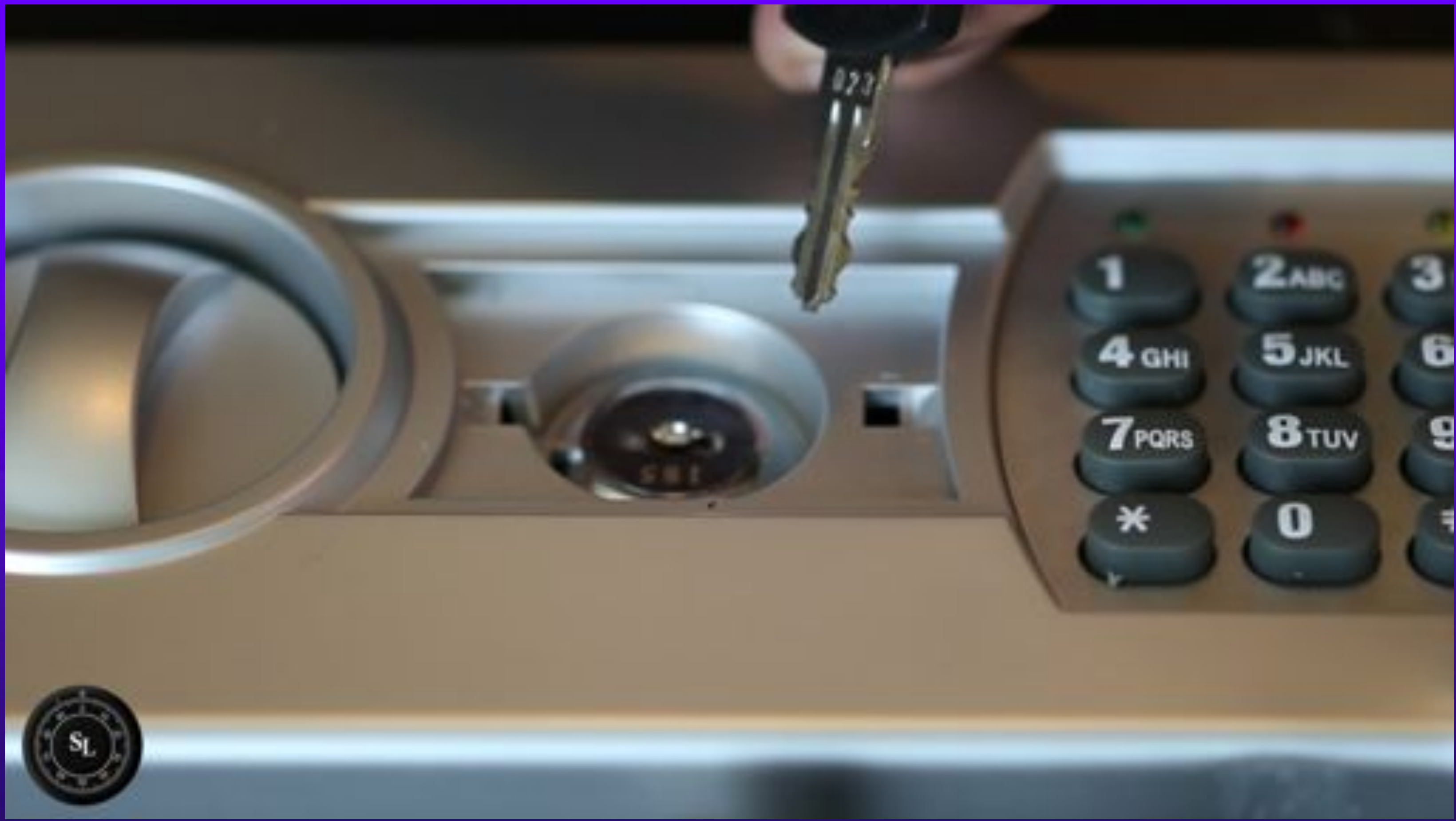
BYPASS SOLENOID WITH WIRE





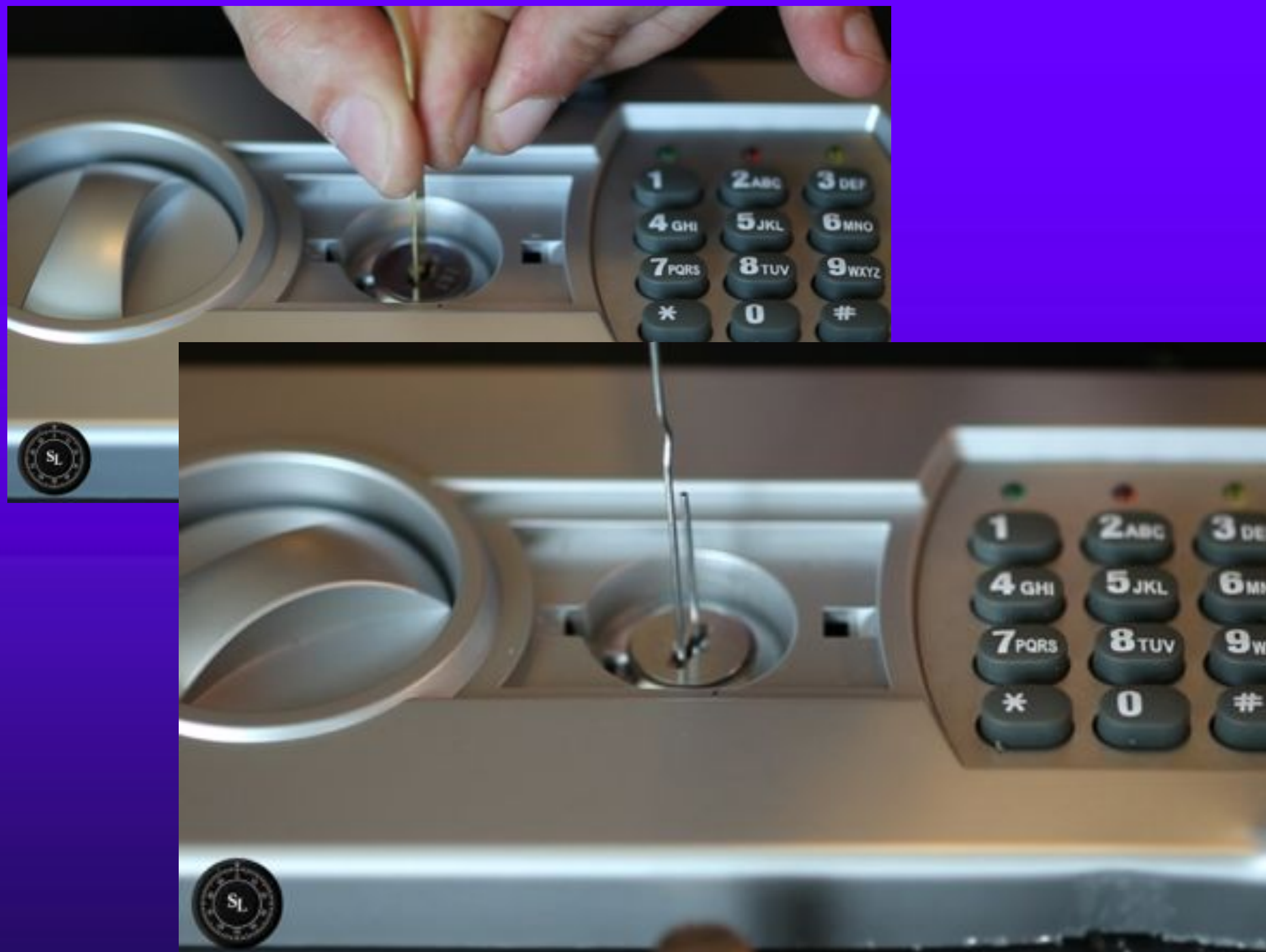
WAFER LOCK BYPASS







SHIMS AND PAPER CLIPS



STACK-ON BIOMETRIC





FALSE PERCEPTION OF SECURITY

- FINGERPRINT READERS DON' T MEAN SECURITY

Great security for pistols, ammo and valuables at home, on the road or in the office.

Tested and listed as California Department of Justice firearms safety devices that conform to the requirements of California Penal Code Section 12088 and the regulations issued thereunder.

Solid steel, pry resistant, plate steel doors, steel live action locking bolts and concealed hinges provide greater security.

New models include **biometric locks** with back up electronic touch pad and trouble key.

Electronic lock can be programmed to "beep" when the numbers on the key pad are pressed or programmed to be silent.



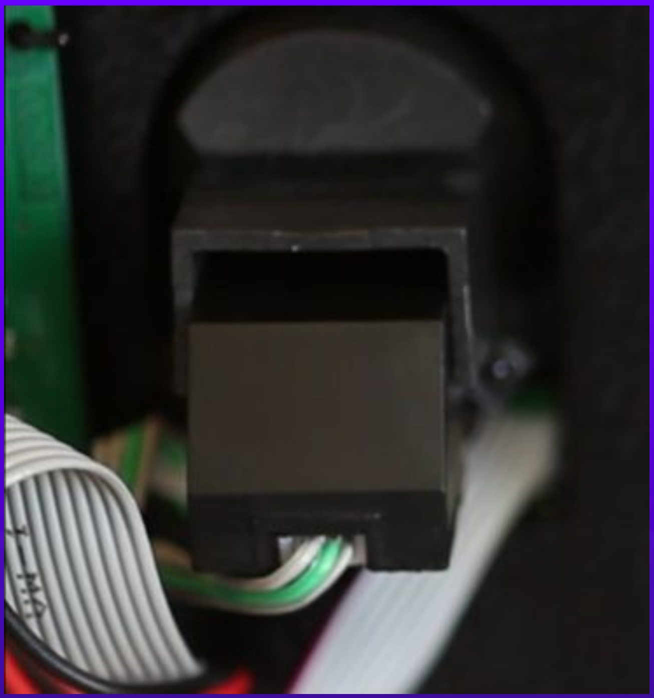
FINGERPRINT READER AND WAFER LOCK = SECURITY





FINGERPRINT READER MODULAR MECHANISM







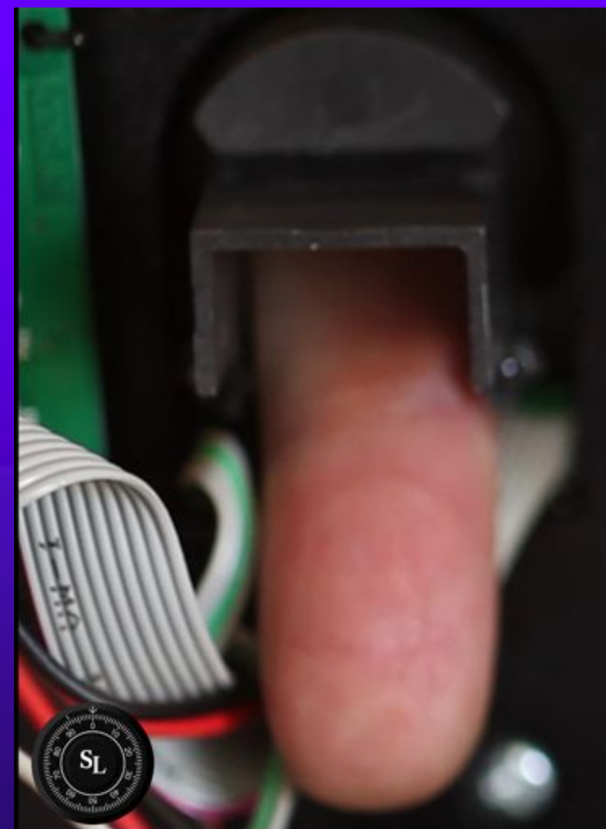
PUSH THE READER AND DISLODGE THE MODULE



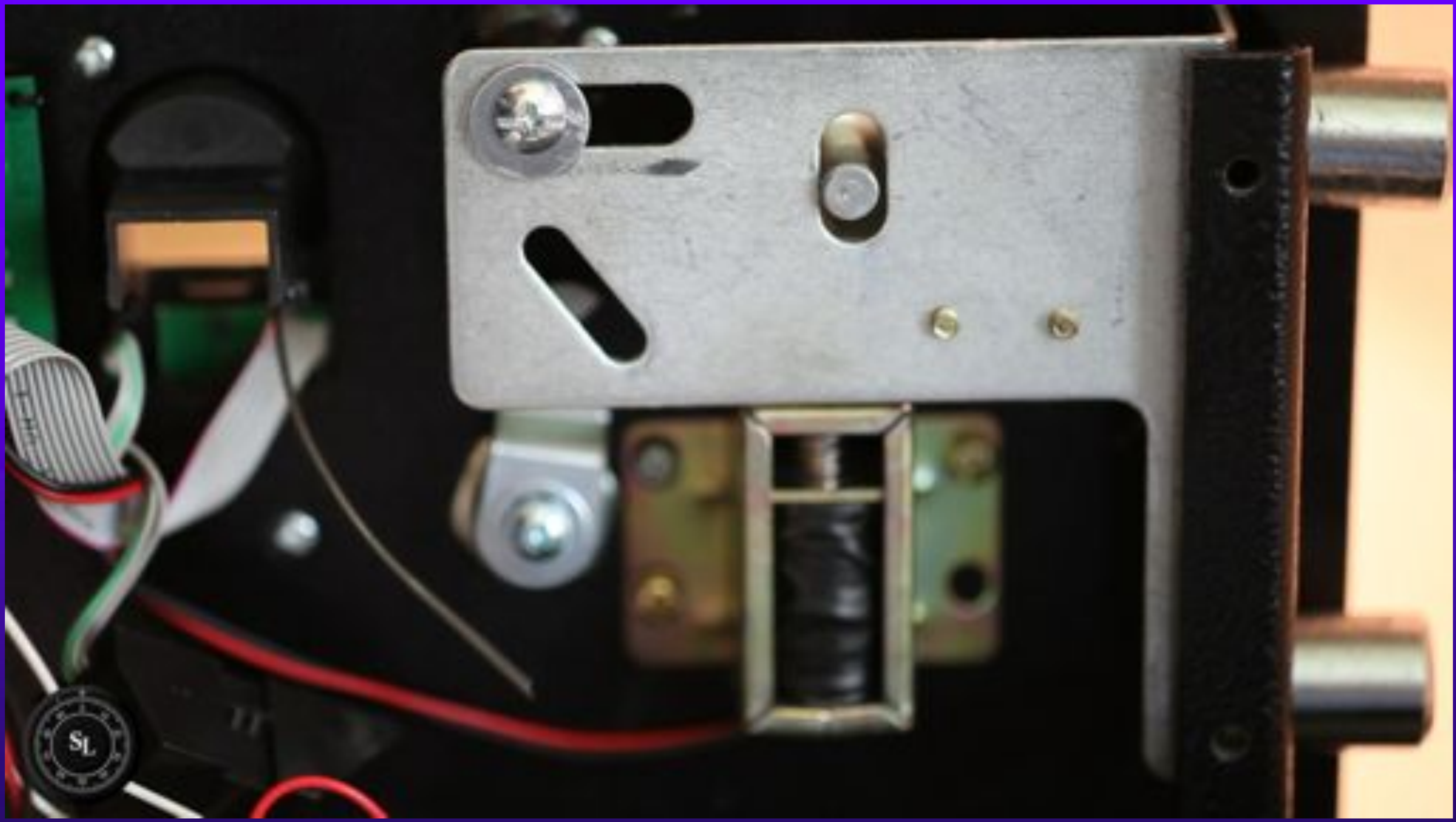


ACCESS THE SOLENOID





WIRE OPENS THE SAFE





STACK-ON QAS 1200B BIOMETRIC SAFE

QAS-1200-B

Quick Access Safe with Biometric Lock

Tested and listed as a California DOJ Firearm Safety Device.

Biometric Lock can accept 28 different fingerprints with back up trouble key. Biometric reader is easy to use and program. Biometric locks provide greater security – no combinations to remember.

Holds standard sized pistols and other valuables. Includes a removable shelf. Foam padded bottom and shelf.

Safe has pre-drilled holes for mounting to the floor, wall or a shelf. Fastening hardware is included with each safe.

SPECS

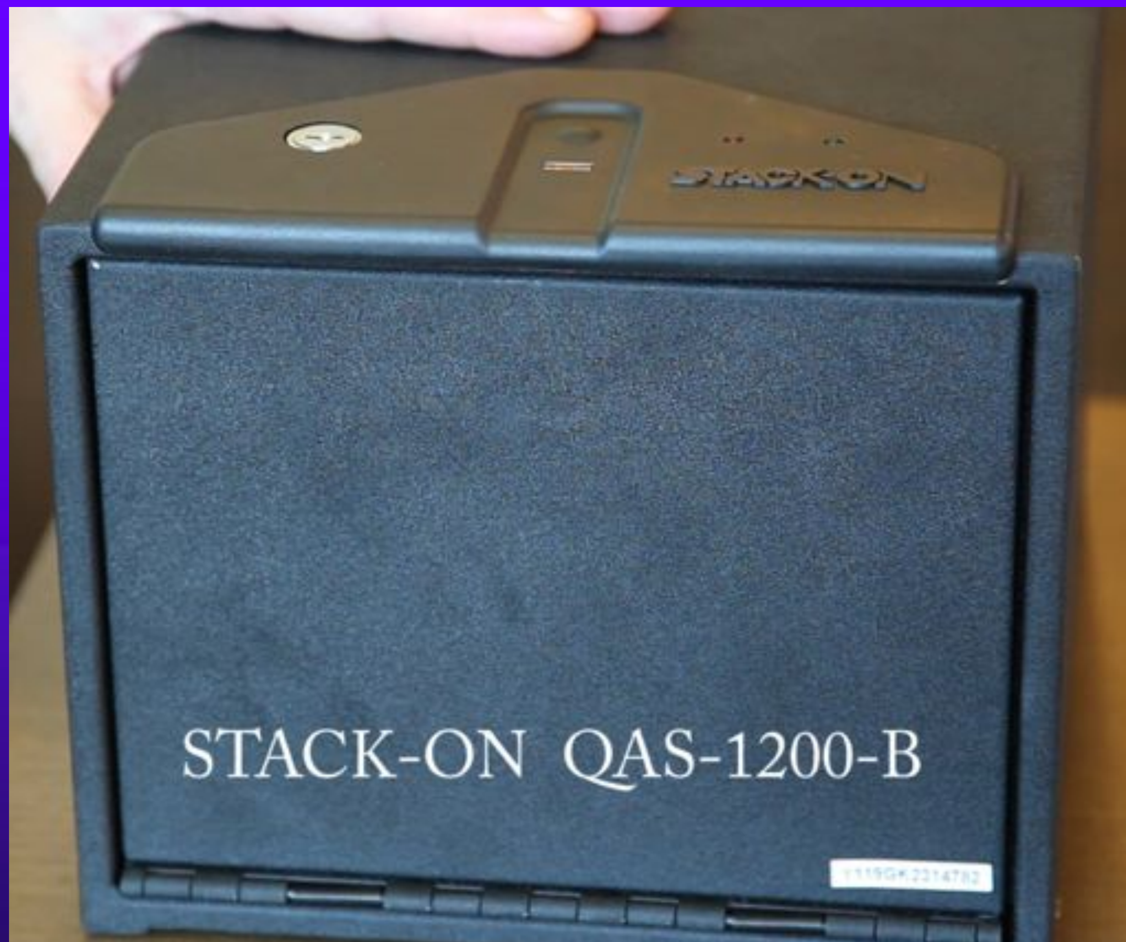
10" wide [31.1 cm]
12-1/4" deep [30.5 cm]
8-1/4" high [21 cm]
[dimensions include key pad]







QAS 1200-B BIOMETRIC SAFE OPEN WITH PAPERCLIP





THE STACK-ON DESIGN



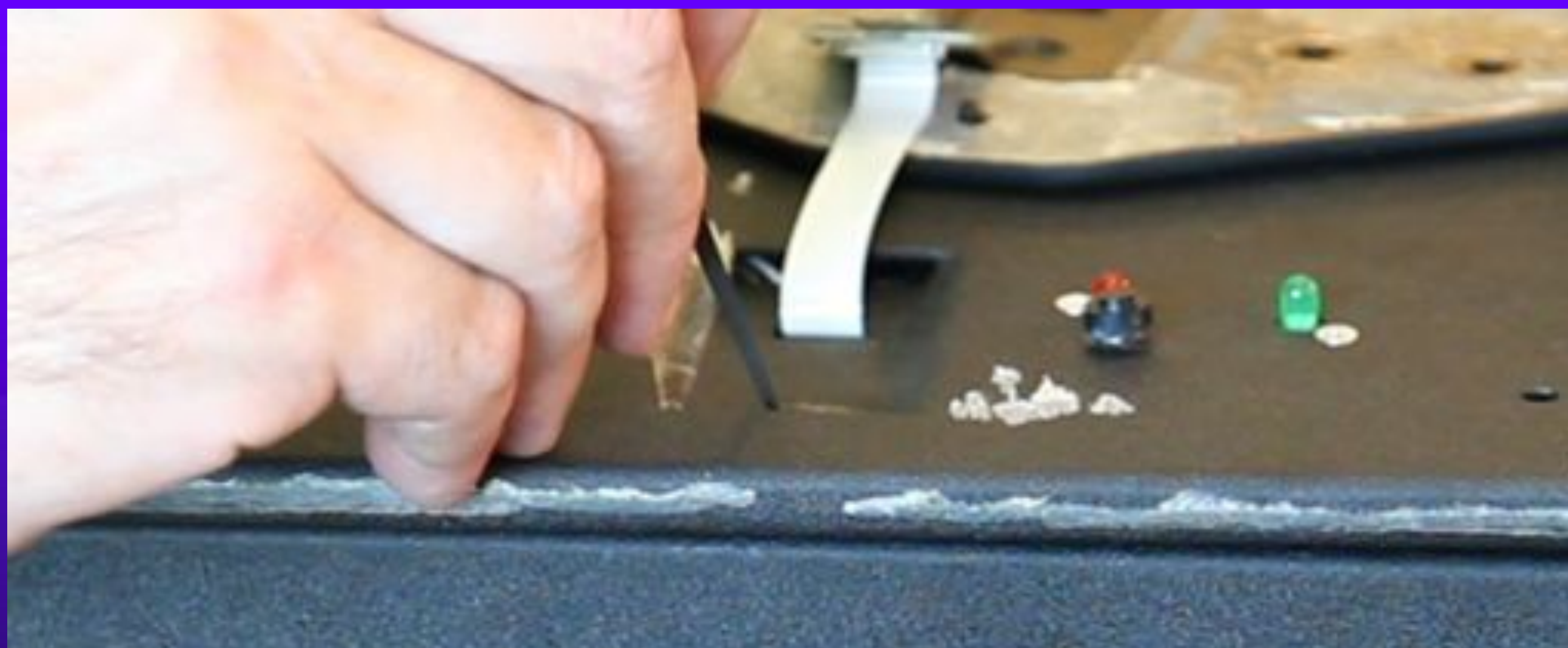


GLUE = STACK-ON SECURITY





HIGH-TECH TOOL TO OPEN: PAPERCLIP



OPENING THE QAS 1200-B





STACK-ON QAS-710

QAS-710

Drawer Safe with Motorized Electronic Lock

Tested and listed as a California DOJ Firearm Safety Device.

All steel construction and low profile design allows for storage in a drawer.

Lid pops up when the correct security code is entered for instant access.

Safe has pre-drilled holes for mounting in a drawer or on a shelf.

Fastening hardware is included with each safe.

SPECS

10-1/4" wide (26 cm)
16-5/8" deep (42.2 cm)
3-1/2" high (9 cm)





STACK-ON QAS-710

- MOTORIZED MECHANISM
- ELECTRONIC KEYPAD
  - Open with straw from McDonalds
  - Open with brass shim
  - Open with Screwdriver
  - Reprogram the combination by accessing the reset switch



OPENING THE STACK-ON QAS-710 ELECTRONIC SAFE



GUNVAULT GV2000S





OPEN THE GUNVAULT

BULLDOG BD1500





OPEN THE BULLDOG



COMPETENT SECURITY ENGINEERING MATTERS

- SECURE PRODUCTS
- PROTECTION OF ASSETS, LIVES, AND PROPERTY
- DEFECTIVELY DESIGNED PRODUCTS HAVE CONSEQUENCES
- LIABILITY
- IF YOU HAVE ONE OF THESE SAFES



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- Mwtobias@security.org
- tbluzmanis@aol.com
- mjfiddler@gmail.com